

name of sour grass, although the taste is more that of a bitter with a slight acidity, and, being avoided by cattle, horses, &c., is considered poisonous.

I am, Sir, yours, &c.
Grenada, March 13. 1833. A SUBSCRIBER.

Additional Observations upon the Insect which infests the Sugar Canes in Grenada. By J. O. WESTWOOD, Esq. F.L.S. &c.

Sir,

As the circumstances detailed in the preceding communication, although here and there somewhat obscure, are of much interest in a commercial point of view, and as they add another species to a catalogue, already too extensive, of insect destroyers of the sugar cane, I trust that the following observations thereupon will not be deemed unacceptable.

The insect forming the subject of the preceding account, submitted to me for examination, proves, both from your correspondent's sketch, and from various specimens contained in the box of cotton accompanying his remarks, to be a Homopterous insect belonging to the Linnæan genus *Cicada*, and to the subgenus *Délphax* as restricted by Latreille. Consequently your correspondent is in error in assigning to it the scientific name of an *Aphis*, although it is not improbable that persons unacquainted with entomology in the West Indies may have bestowed upon it, from its resemblance to the common plant lice, the French vernacular name of the *Aphides*, *pucceron*. So also your correspondent appears to have gratuitously furnished the insect, in his description of it, with two spines, which, as to place, he has assigned to the posterior part of the body, but which, although characteristic of the genus *Aphis*, are not found in the specimens which he has himself forwarded of the insect in question, nor, indeed, in any of the *Cicadidæ*.

It does not appear quite clear in what manner the insect attacks the plants. Your correspondent, indeed, mentions "a snout and beak ending in a bristle," which he considers may be for "the double purpose of depositing its eggs and extracting its food." As, however, it is of absolute necessity that we should be perfectly acquainted with the peculiar modes or attack of our insect depredators, before we can think of proposing any effectual remedy for their destruction, it may be allowed me to endeavour, from the peculiar anatomy of these insects, from analogy, and from your correspondent's notes, to show the real cause of the mischief. Now, the

female of this insect, in common with all of the Cicadidæ, is furnished at the extremity of the body, beneath, with an admirably formed pair of saw-like organs, which are expressly for the purpose of cutting grooves in various vegetable productions, in which the eggs are then deposited. A full account of this apparatus is given by Reaumur: but, the Aphides not being furnished with it, their progeny is deposited upon the surface of plants. Where, therefore, the Grenada insect abounds, it is not improbable that much mischief may be occasioned by the interruption of the juices of the plants; but I can scarcely think that this (which is the chief complaint of your correspondent) can be the primary cause of the mischief. He, indeed, adds, although doubtfully, that the insects regale themselves upon the sweets of the sugar cane, and, from their numbers, literally bleed the plant to death. Now, the under side of the head of the insect in all the different stages of its life, is furnished with a jointed sucker having several fine internal darts (the snout and beak ending in a bristle, of your correspondent), which it thrusts into the leaves or stems of plants, for the purpose of pumping up its fluids, which are its only nourishment; but in no instance of which I am aware is this kind of rostrum employed in forming a receptacle for the eggs.*

Many of your readers have, doubtless, often observed in the spring a quantity of frothy matter upon various plants. This is caused by an insect nearly allied to the Grenada pest, and is commonly known by the name of the cuckoo-spit insect (*Aphrophora spumaria*). In this instance the frothy matter is nothing else but the sap of the plant which the insect has pumped up into its stomach by its snout, and afterwards ejected; and we can easily conceive, if any plant were to be attacked by myriads of this insect, how great would be the damage which it would sustain, the operations of this insect, from the similarity in the structure of the mouth, being very similar to those of the plant lice: and your readers are all aware how exceedingly detrimental some species of the latter genus (*Aphis*) are in England; one of them, *Aphis humuli*, often occasioning damage as serious to the grower of the hop as the Grenada insect does to the planter of the sugar cane.†

* In the weevils (*Curculionidæ*), however, this appears to be the case, it being recorded that the nut weevil (*Balaninus nucum*) pierces with its long snout the shell of the nut in which it deposits its eggs. (See, also, Rusticus of Godalming, in the *Entomological Magazine*, p. 35.)

† See a most able essay on the habits, and injurious effects on vegetation, of the *Aphis* generally, and of the *Aphis humuli* (or hop fly, or hop louse) in particular, and in full detail, by Rusticus of Godalming, in the *Entomological Magazine*, vol. i. p. 217 to 224. — *J. D.*

I may also mention, as closely connected with this subject, that, at the meeting of the Society of Natural History of the Island of Mauritius, on the 12th of September, 1832, a memoir was read upon the habits of another insect, nearly allied to the Grenada insect, termed the *cercopé écumeuse* (*Aphrophora Goudot*; Bennett), found in very great quantities upon trees in the island of Madagascar, the larva of which has the power of emitting a considerable quantity of clear water, especially in the middle of the day when the heat is greatest. A further account of this insect appears in the *Proceedings of the Zoological Society of London*, on January 22, 1833, from which it is evident that, instead of remaining in a frothy mantle, as with the cuckoo-spit insect, as a defence to the insect, the fluid which it has pumped up from the plant into its stomach is ejected in great quantities, and falls to the ground in a constant and considerable shower.*

From these circumstances, I think it can scarcely be doubted that the chief injury caused by the Grenada insect arises from its continually sucking the plants.

The sugar cane is also attacked by other insects. In the *Transactions of the Society of Arts*, vol. xlv., the late Rev. Lansdowne Guilding has published a valuable paper, for which he received the gold Ceres medal of that society. He describes a very large weevil † (*Calandra palmorum*) which, although generally feeding upon the species of palm, will occasionally attack the sugar cane; also a smaller species of the same genus (*C. sacchari* Guild.), commonly termed "the borer," ‡ which confines its attacks to the latter plants, the larva burrowing into and feeding within the centre of the stems of the cane. A third insect, called "the little borer," is a pyralideous moth (*Diatraea sacchari* Guild.), for the destroying of which a reward of 50*l.* was offered by the Society of Arts. (Kirby and Spence, *Introd.*, vol. i. p. 183.) This is by far the most destructive and common enemy to the cane; especially

* Mr. Bennett has informed me that he has observed that the common cuckoo-spit insect is capable of producing similar effects, although in a much less degree.

† We have several British species of *Délfax* nearly allied to the Grenada insect; but it is curious that they are here generally found among grass and low herbage. I, however, have recently met with a species near Cambridge in some quantity upon tall reeds.

‡ This is evidently "the unknown species of horned beetle," noticed by Kirby and Spence. (*Introduction*, vol. i. p. 183.)

§ A figure of the larva, cocoon, pupa, and imago of *Calandra palmorum*, and of those of *Calandra sacchari* Guilding, with a description of the habits of the two species of insect, are given in this Magazine (Vol. V. p. 466-470.); both the figures and description are copied from the *Transactions of the Society of Arts*, vol. xlv. p. 153.

in the caterpillar state, when, like the preceding insect, it burrows into and feeds upon the centre of the stems: The cane is never exempt from this dreaded pest, which occasionally, in some islands, destroys whole acres of plants. In addition to these, Mr. Guilding (on the authority of Kirby and Spence, who quote Humboldt and Bonpland) mentions the large firefly (*Elaternoctilucus L.*) as having been said to have been bred in the cane, but probably only accidentally! Myriads of ants (*Formica saccharivora L.*), also, which once infested, but have now disappeared from, Grenada, committed the most frightful ravages, which are detailed by Kirby and Spence in their *Introduction*, vol. i. p. 185. Latreille also describes a solitary species of ant under the name of *Formica analis* (which is the *F. foetens Eab.*), which lodges in the interior of the stems, and destroys the plants. Messrs. Kirby and Spence add, from Browne's *Civil and Natural History of Jamaica*, that the sugar cane has also its *Aphis*, which sometimes destroys the whole crop; and on this authority Mr. Guilding mentions that "an undetermined *Aphis*" proves injurious. He also mentions "the jumper fly," which, he thinks, is "probably one of the *Chrysomelidæ*," perhaps alluding to one of the *Hálticæ*, of which our turnip fly is a species: but, as your Grenada correspondent has shown that the *Délphax* is regarded as an *Aphis*; and as, like all the other *Cicádida*, it possesses the power of leaping; it seems very probable that it is also identical with "the jumper fly;" and, consequently, "the jumper fly" is not a chrysomelideous insect, or a *Háltica*.

As to any attempts which may be made for the extirpation of this insect, I confess that I can see but little chance of success. In respect to the first three insects recorded by Mr. Guilding, the grubs of which, it must be borne in mind, feed upon the internal part of the stems of the cane, and are only injurious in their first state, that gentleman thinks that no remedy can be applied in extensive tracts of land, although, by carefully searching the plants, and stripping them of their dead leaves, which harbour the parent insects, they may be prevented from depositing their eggs. In the instance of the ant (*Formica saccharivora L.*), whose destructive powers were so dreadful that a reward of 20,000*l.* was offered to any one who should discover an effectual mode of destroying them, nothing could be found to stay their ravages. The aid of fire was even resorted to in vain; the insects "rushing into the blaze in such myriads of millions as to extinguish it. Vain was every attempt of man to effect their destruction, till, in 1780, it pleased Providence to annihilate them by torrents

of rain." The insect under consideration differs from the preceding kinds in the nature of its depredations; since, like the Aphides, it feeds externally in all its stages; and I have no doubt that, like those insects, it is chiefly upon the young and tender shoots that it makes its attacks. Now, it is well known that, owing to this circumstance, and to the great fecundity of the insects, no success has hitherto attended the innumerable attempts which have been made to destroy the Aphids of the hop plant (*Aphis humuli*): and, in like manner, I can see but little ground for coming to any other conclusion than that arrived at by Mr. Guilding, namely, that man will not be permitted to frustrate the intentions of Providence; but that we must look alone with submission to that Power for the removal of these pests.

I shall conclude these observations by describing the Grenada insect under the name of

DELPHAX saccharivora Westw. (fig. 54. b, somewhat magnified.)

Pallide virescens; capite subrostrato; alis anticis (e) nervo secundo apicali tantum bifido; antennis supra lineam nigram.

Longitudo corporis $1\frac{1}{2}$ lin.; expansio alarum $4\frac{1}{2}$ lin. Habitat in Insula Grenada, Indiae occidentalis, Saccharum officinarum L. destruens.

Allied to *Delphax marginata* and *pellucida*. Head, thorax, and abdomen pale yellowish green, the latter clothed at the extremity with a white downy secretion; head produced in front into a short narrow snout, clypeus beneath 3-carinated; eyes brown, with a notch beneath to receive the base of the antennae (which are of a pale green colour with a dark line in front, and which are not quite so long as the head) with the basal joint half the length of the second; the terminal joint is a slender seta (a); rostrum extending to the base of the middle legs; upper wings (c) ample;



much longer than the abdomen, nearly transparent, and almost colourless; the inner margin slightly tinged with yellowish; nerves pale green; the second apical nerve alone (and not the 2d and 4th, as in our allied British species) forked; under wings colourless; legs of a pale dull greenish yellow, formed for leaping, the anterior part not dilated.

The Grove, Hammersmith. I am, Sir, yours, &c.

July 24, 1833. J. O. WESTWOOD.

In fig. 54. b is a copy of the drawing sent by our Grenada correspondent; a and c have been obligingly added by Mr. Westwood. In the first, at the upper end, are exhibited the eggs of the insect; in the last two, the objects represented are considerably magnified. — *J. D.*